

Product Performance Data Evaluation Report  
by Kevin J. Sweeney, Entomologist, Insecticides Branch

Date: April 26, 2006

Reviewer: Ann Sibold

Product: Phantom-Termiticide Insecticide

EPA Registration No. 241-392

PM: Richard Gebken, PM 10

Decision #: 363176

DP No: 325143

OPPTS Guideline: 810.3500 & 3600

Chemical: 21.45% chlorfenapyr.

GLP studies: all submitted studies were non-GLP.

Use pattern/application rate: Applied at 0.125% and 0.25% dilution as a post-construction application to control subterranean termites. Applied at 0.5% and 0.25% dilutions for other pests indoors.

Request: Review label amendment and supporting efficacy to add new pests and add a new use pattern. New pests include beetles, spiders, bed bugs, boxelder bugs, pillbugs, centipedes, house crickets, house flies, European earwigs, bark scorpions, silverfish and paper wasps.

Note that registrant changed the label direction for ants. On the previously approved label, household and structure investing ants were described as "acrobat ants, Argentine ants, carpenter ants, odorous house ants, pavement ants, Pharaoh's ant, pyramid ants, and other species" On the proposed label, this description has been removed and the general term "ants" is used instead.

**Part I. Review of efficacy studies submitted in support of adding new pests to the label.**

**MRID 46710106** Laboratory evaluation of Termidor SC and Phantom in the control of the black widow spider, wolf spider, boxelder bug, European Earwig, pillbug, Asian Lady beetle, Darkling Beetle (larva) and the bed bug.

**Method:** Tests were conducted in 16 oz plastic cups contained a layer of sandy loam substrate.



There were four treatments for each test: an untreated control, a 0.25% and 0.5% chlorfenapyr dilutions of the Phantom product, and a 0.0625% fipronil dilution of the Termidor SC product (EPA Reg. No. 432-901) as a positive control. Each treatment was replicated four times with 10 individuals per replicate. Due to predation, the black widow spider and wolf spider replicates consisted of only 1 spider each but were replicated 10 times. Each replicate was sprayed directly with 1.2 ml of the test dilution. Treated organisms were not transferred to clean cups but were left exposed to the treatment for up to 72 hours. Mortality was assessed at 24, 48, and 72 hours post-treatment.

**Results:** The results indicate that a 0.25% chlorfenapyr dilution prepared from the Phantom product was efficacious against the black widow spider, boxelder bug, European earwig, pillbug, and the larval stage of the Darkling beetle, the yellow mealworm. Phantom was effective against bed bugs at a dilution of 0.5%. Phantom was not effective against the wolf spider or the Asian Lady beetle and these data do not support their addition to the subject label.

**MRID 46710107** Evaluation of Termidor SC and Phantom in the control of the bark scorpion, centipede, cellar spider, millipede, silverfish, and brown dog tick.

**Methods:** Tests were conducted in 16 oz. plastic cups. There were three treatments for each test: an untreated control, a 0.25% chlorfenapyr dilution of the Phantom product, and a 0.0625% fipronil dilution of the Termidor SC product (EPA Reg. No. 432-901) as a positive control. Each treatment was replicated four times with 10 individuals per replicate. Due to predation, the bark scorpion, cellar spider, and centipede replicates consisted of only 1 individual each but were replicated 10 times. Each replicate was sprayed directly with 1.0 g of the test dilution. Treated organisms were transferred to clean cups. Mortality was assessed at 1, 4, 24, and 48 hours post-treatment.

**Results:** The test results indicate that the 0.25% chlorfenapyr dilution of the Phantom product was effective against bark scorpions, centipedes, cellar spiders, and silverfish. The 0.25% dilution was not effective against millipedes and brown dog ticks.

**MRID 46710108** Evaluation of Phantom-based direct spray against saw-toothed grain beetles and confused flour beetles.

**Methods:** Tests were conducted in a Peet-Grady chamber. Beetles were sprayed with 1.78g of the 0.5% chlorfenapyr dilution of the Phantom product. Ten replicates were testing and each replicate consisted of ten beetles. Ten untreated replicates were used as the negative control. Mortality was assessed at 1, 4, 8, and 24 hours after treatment. One-half the treatment cups were transferred to clean cups while the other half remained in treated cups.

**Results:** The 0.5% dilution was 100% effective in killing the adult life stage of the saw-toothed grain beetle and confused flour beetle.

**MRID 46710109** Knockdown efficacy evaluations of Phantom and Termidor against selected arthropod pest species in the laboratory.



**Methods:** For odorous house ant, striped-tailed scorpions, black widow spider, brown recluse spider and earwigs tests were conducted in 16 oz plastic cups contained a layer of sandy loam substrate. For the house cricket, Australian cockroach, Oriental cockroach, and paper wasp the treatment container was a steel mesh cage. There were four treatments for each test: an untreated control, a 0.25% and 0.5% chlorfenapyr dilutions of the Phantom product, and a 0.0625% fipronil dilution of the Termidor SC product (EPA Reg. No. 432-901) as a positive control. Each treatment was replicated five times. The number of individuals per replicate varied with the species tested. Each replicate was sprayed directly with 1.2-2.4 ml of the test dilution. Mortality was assessed at 30 minutes, 1, 2, 4, 8, and 24 hours post-treatment.

**Results:** The 0.25% dilution was effective against the odorous house ant, house cricket, Oriental cockroach, earwig, and black widow spider. Phantom did not control the brown recluse spider, Australian cockroach and the striped-tailed scorpion at a concentration of 0.25% or 0.5% chlorfenapyr. The product was effective against paper wasps but knockdown did not occur until four hours post-treatment. Therefore, if paper wasps are added to the label, the directions for use should mention that the product is not a knockdown agent.

**MRID 46710110** Evaluation of a Phantom-based direct spray against house flies.

**Method:** Ten replicates of ten flies each were treated with 2g of 0.5% chlorfenapyr dilution of Phantom. Ten replicates of ten flies each served as untreated controls. Half of the treated flies were transferred to clean cups while half remained in the treated containers. Mortality was assessed at 1, 4, 8, and 24 hours post-treatment.

**Results:** Phantom was a 100% effective against house flies.

#### **Entomologist's Comments and Recommendations for adding the proposed pests:**

1. The data do not support the addition of the brown recluse spider, the Australian cockroach, striped-tailed scorpion, Asian lady beetle, millipede or brown dog tick.
2. Bed bugs, house flies, saw-toothed grain beetles and confused flour beetles must be treated the 0.5% dilution.
3. The product was effective against paper wasps but knockdown did not occur until four hours post-treatment. Therefore, if paper wasps are added to the label, the directions for use should mention that the product is not a knockdown agent.
4. The 0.25% and 0.5% dilutions will kill odorous house ants, centipedes, Oriental cockroaches, house crickets, black widow spiders, earwigs, silverfish, bark scorpions, boxelder bug, cellar spiders, pillbugs, and the larva of the Darkling beetle, the yellow mealworm.



## II. Review of studies submitted in support of soil applied termiticide application.

Conditional confirmatory data submitted in support of the conditional post-construction treatment.

**MRID 46710104** Report on termite bioassays performed on aged soil treated with chlorfenapyr, the active ingredient in Phantom Termiticide-Insecticide

These data were collected as a condition of the Phantom post-construction soil applied termiticide registration granted in 2001.

**Method:** Termite bioassays were performed with soil treated at least five years prior with chlorfenapyr. The protocol was agreed upon by BASF, EPA and USDA-FS. The purpose was to determine the chlorfenapyr residue levels in USDA-FS. Using the same soils to determine the effectiveness of the treated soil against termites exposed under laboratory conditions. Termite species tested consisted of *Reticulitermes flavipes*, *Heterotermes aureus*, and *Coptotermes formosanus*. Test termites were from three field colonies per species. The number of replicates was: 3 colonies x 3 species x 5 test replicates x 7 chlorfenapyr treatment levels = 315 replicates /test site x 4 USDA-FS sites = 1260 replicates. This degree of replication produced a data set that could be deemed reliable and submitted to ANOVA statistical analyses.

Results: Testing soil for termiticide residues generally yields variability in the results. In this case, the mean residue per plot was determined.

0.125% dilution applied at 1gal/10square feet	the average chlorfenapyr residue was = 64.15ppm
0.25% dilution applied as above	=144.95ppm
0.5% dilution applied as above	=342.25ppm
0.75%dilution applied as above	= 568.50ppm
1.0% dilution applied as above	= 740.50ppm
2.0% dilution applied as above	= 1686.0ppm

<i>Reticulitermes flavipes</i>	LT100 = 4-5 days	LT90 = 2 days	LT95 = 3 days
<i>Heterotermes aureus</i>	LT100 = 1 day	LT90 & LT95 = less than 1 day	
<i>Coptotermes formosanus</i>	LT100 = 2 days.	LT90 = about 1 day	LT95 = 1-2 days.

Differences in mortality were concluded to be due to species differences in susceptibility and not variability in residues between USDA-FS plot location.

The results show that at up to seven years there are residues present capable of killing termites at all tested concentrations under laboratory conditions. Chlorfenapyr works slowly and did not exhibit repellent qualities at the concentrations tested in these soils subjected to field conditions.

**MRID 46710105** Soil residue of chlorfenapyr following application of Phantom Termiticide-Insecticide in USDA-FS and EUP Trials.

These data are interesting and demonstrate the amount of variability in soil residue levels that can be found following termiticide applications in experimental plots and at treated structures.



As expected, vertical treatments yielded higher residues than horizontal treatments. Residues appear to be present in all treatments but in some cases were quite low. However, I do think EPA should bridge these results from the EUP to the USDA-FS plots to the laboratory bioassays discussed above to the USDA-FS field efficacy results in order to make an argument for accepting EUP residue data as a soil applied registration standard or data point useful in making a registration decision. EUP sites are under the control of the property owner only and not BASF or its contractors. Therefore, we really don't know what else has happened at every site over time and among applicators.

**MRID 46710101** Overview of research supporting the use of Phantom brand chlorfenapyr as a treatment for control of subterranean termites.

This "study" summarizes information on the termiticide data and use pattern. The argument presented for approval of the pre-construction treatment is based on the data EPA reviewed in 2001 where 92% of the USDA-FS plots were protected in the concrete slab test at the 0.125% dilution. EUP results showed that 93% of the treated homes were protected. However, in the tests completed between 1999 and 2004, there are multiple examples of penetrations in treated plots in the concrete slab and ground board test. Of equal importance is that these penetrations occurred in the same plot for up to three years in Mississippi. Wood damage was substantial in these plots. This is clear evidence of plot invasion and lack of protection. Chlorfenapyr works slowly but not slowly enough to allow for wood damage if present in concentrations capable of killing termites in 5 days. For heavier damage to wood to occur, there must be a period of prolonged termite feeding.

For the post-construction use pattern, conditional confirmatory laboratory and field residue data submitted by BASF showed that there are chlorfenapyr residues present in treated areas through five years and greater. In addition the LT99 is about 4-5 days for termites coming into contact with chlorfenapyr treated soils. The study was discussed in greater detail above.

**MRID 46710102** USDA-FS termiticide field evaluation of Phantom Termiticide-Insecticide.

The first half of this report was reviewed previously by EPA in making a registration decision on the Phantom soil applied termiticide use pattern.

Based on these USDA-FS data collected from 1997-2001, the Agency decided that the results supported the approval of the post-construction soil applied termiticide use only. In post-construction use applications, if failures occur, retreatments can be made. Note that to date EPA is not aware of any reports on the failure of chlorfenapyr to control termites in infested structures when applied in accordance with Phantom product label directions.

In 1999 a second set of plots were established to determine evaluate the efficacy of the Phantom formulation, a suspension concentrate, to a water dispersible granule formulation. These tests were also performed in the hope of achieving better results with chlorfenapyr formulations as soil applied termiticides. These plots were less successful than the original plots established in 1997. Of greatest importance, there were consecutive failures in the concrete slabs tests at the 0.125% dilution in Mississippi. This is not acceptable and does not support a pre-construction



use pattern approval because the structure would need to re-inspected annually.

**46710103 Phantom Termiticide-Insecticide Treatment to Soil for Control of Subterranean Termites – EUP trials.**

These data describe the EUP data in which 501 structures were treated nationwide. Of these, nearly 100 dropped out of the program. Data are reported for the entire EUP from 403 structures. 93% of these were successful but there was a subset (16 homes) in the first six months and none thereafter. Overall the program successfully eliminated termite infestations from treated structures. These are supplementary data confirming termiticide performance.

**II. Entomologist's Recommendations and Comments:**

1. The conditional confirmatory data are acceptable and support the post-construction soil applied termiticide use pattern as approved by EPA.
2. The data do not support the addition of the soil applied pre-construction use pattern to the Phantom Insecticide-Termiticide Label.
3. Label changes proposed by BASF. Thirty two label changes are proposed. I numbered the changes you submitted for your label to make my response easier to understand.
  - a. Remove all references to pre-construction treatment from the label.
  - b. Remove the changes made to the modified note regarding exceptions to application volume. The changes proposed to spacing in which 16 inch spacing would be included are not acceptable. Retain the present language.
  - c. Change in precipitation language. Retain the statement: "Do not treat while precipitation is occurring".
  - d. Changes numbered 3, 4, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 24, and 25 are not acceptable. Please modify number 30 in accordance with the comments made for the general pests above. Ann Sibold and Richard Gebken can comment on your remaining proposals.

I realize that there are places on the label that are redundant. However, before we begin to customize your label or any others, I believe the action requires wider discussion with EPA and ASPVCRO to maintain consistency in approaches and interpretations regarding such actions.